



# Efficacy and toxicity of intravenous iron in a mouse model of critical care anemia

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Résumé en anglais	<p><b>OBJECTIVE:</b> Anemia is common in critically ill patients, due to inflammation and blood loss. Anemia can be associated with iron deficiency and low serum hepcidin levels. However, iron administration in this setting remains controversial because of its potential toxicity, including oxidative stress induction and sepsis facilitation. The objective of this work was to determine the efficacy and toxicity of iron administration using a mouse model mimicking critical care anemia as well as a model of acute septicemia. <b>DESIGN:</b> Prospective, randomized, open label controlled animal study. <b>SETTING:</b> University-based research laboratory. <b>SUBJECTS:</b> C57BL/6 and OF1 mice. <b>INTERVENTIONS:</b> Intraperitoneal injection of zymosan inducing generalized inflammation in C57BL/6 mice, followed in our full model by repeated phlebotomies. A dose equivalent to 15 mg/kg of ferric carboxymaltose was injected intravenously on day 5. To assess the toxicity of iron in a septicemia model, OF1 mice were simultaneously injected with iron and different <i>Escherichia coli</i> strains. <b>MEASUREMENTS AND MAIN RESULTS:</b> To investigate the effect of iron on oxidative stress, we measured reactive oxygen species production in the blood using luminol-amplified chemiluminescence and superoxide dismutase 2 messenger RNA levels in the liver. These markers of oxidative stress were increased after iron administration in control mice but not in zymosan-treated mice. Liver catalase messenger RNA levels decreased in iron-treated control mice. Iron administration was not associated with increased mortality in the septicemia model or in the generalized inflammation model. Iron increased hemoglobin levels in mice fed with a low iron diet and subjected to phlebotomies and zymosan 2 wks after treatment administration. <b>CONCLUSIONS:</b> Adverse effects of intravenous iron supplementation by ferric carboxymaltose seem to be minimal in our animal models. Furthermore, iron appears to be effective in correcting anemia, despite inflammation. Studies of efficacy and safety of iron in critically ill patients are warranted.</p>
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